DOCUMENT RESUME

ED 183 554 SP 015 786

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TITLE Pupil Perceptions of Teacher Presage and Process Variables and their Relationship to Pupil Perceptions of Instructional Effectiveness.
PUB DATE Feb 80
NOTE 9p.; Paper presented at the Annual Meeting of the Southwest Educational Research Association (San Antonio, TX, February 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Effective Teaching; *Rapport; Science Education; *Student Evaluation of Teacher Performance; Student Motivation; *Student Teacher Relationship; *Teacher Behavior; Teaching Methods

ABSTRACT

Five hundred and twenty-nine science students, clustered into teacher-determined ability level groups, were queried in order to obtain ratings of fifteen teacher presage characteristics and nine process variables. The Classroom Teacher Inventory (CTI) was used. Results indicate significant discriminant functions between effective and ineffective instructors, as well as between pupil perceptions of teacher presage and process characteristics by student ability level. The study suggests that high-ability students may place a greater value on teachers' subject area training, while low-ability students may place the emphasis on the teachers' ability to develop rapport with students. (LH)

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ED183554

PUPIL PERCEPTIONS OF TEACHER PRESAGE AND PROCESS VARIABLES AND THEIR RELATIONSHIP TO PUPIL PERCEPTIONS OF INSTRUCTIONAL EFFECTIVENESS

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Paper Presented at the Annual Meeting
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SP015786

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ABSTRACT

This study attempted to identify process and presage variables that significantly discriminated between effective and ineffective science instructors. The Classroom Teacher Inventory (CTI), an instrument designed to solicit pupil ratings of fifteen teacher presage characteristics and nine process variables (Brooks, 1977), was administered to 529 students of the physical sciences in teacher determined ability groups. Results indicated significant discriminant functions between effective and ineffective instructors. Specifically, those teachers who are friendly, exhibit pupil empathy, and are consistent and predictable are perceived as more effective. Instructionally, teachers who explain until understanding is achieved, use student ideas during instruction and are clear during instruction are perceived as more effective. Results indicated significant discriminant functions between pupil perceptions of

teacher presage and process characteristics by student ability level. The presage characteristics, wide interest patterns and subject area prepared, showed significant difference of effective and ineffective science teachers between ability groups. It also suggested that the process variables, clarity, provides opportunities to learn criterion, and enthusiasm differed significantly between ability groups.

PROBLEM

Dramatic instructional and curricular changes have occurred in the field of science education in the past ten years (Schulman and Tamir, 1973). These changes have occurred mainly in subject matter, content, organization and emphasis (Klopfer, 1971). Methods and techniques such as attention to learning hierarchies, the discovery method of instruction and strategies for verbal learning have been introduced into science programs (Gagne, 1961, 1970; Bruner, 1961; Ausubel, 1968). However, studies correlating selected curriculums and techniques with teacher effectiveness and pupil achievement have not proven the ability of any one technique or organization to improve learning (Yager, Englen and Snider, 1969).

Teacher behavior as the critical variable in science education programs has been hypothesized as a potentially more influential variable than specialized organization, techniques or curriculum changes (Schefler, 1965). Teacher enthusiasm and good pupil relationships have been reported by students in all ability levels as characteristics of effective science teachers (Bybee and Chaloupke, 1970). Adequate personal relationships with students and enthusiasm in working with students have been reported to rank higher in importance by

science teachers than the knowledge of the subject matter, planning and methodology (Bybee, 1978).

While science teachers report that personal relationships and enthusiasm are necessary conditions for teacher effectiveness, these characteristics may not be sufficient for high level ability groups. It may be that pupils at specific ability levels place a different emphasis on those characteristics that contribute to perceived effectiveness.

PURPOSE

The primary purpose of this investigation was to follow-up existing research relating to teacher behavior as a variable in learning. A secondary purpose was to investigate pupils' perceptions of effective and ineffective science teachers and determine which characteristics appeared to discriminate between ability groups. Four hypotheses were tested: (1) Teachers rated as effective and ineffective will differ significantly on pupil perceptions of teacher presage characteristics. (2) Teachers rated as effective and ineffective will differ significantly on pupil perceptions of process characteristics. (3) Pupil perceptions of teacher presage characteristics will differ significantly by student ability level. (4) Pupil perceptions of teacher process characteristics will differ significantly by student ability level.

PROCEDURE

The Classroom Teacher Inventory (CTI) was administered in December 1978 to 529 students of the physical sciences in two junior highs and one high school, representing a "generally middle class socio-economic group in a suburban community." These classes were selected because of thei

similarities in teaching structure, classroom organization, and subject material covered. A total of 153 students were placed by teachers in the high ability level, 305 students in the middle ability level and 71 students in the low ability level of science aptitude.

The regular classroom teacher submitted ability level rankings of each of their students using the number one as a high level student, two as a medium level student and three as a low level student. The teachers were instructed not only to consider their present science grades, but were instructed to consult past teachers and permanent records if difficulty in rating students occurred.

From the ability level ranking, the teacher's assigned number, class schedules, sex, and class ranking, the students were assigned identification numbers to insure anonymity. The students were assured that no one except the researcher would be informed of how they answered the survey and that it would in no way affect their grade. The students were instructed to answer the questions on the CTI concerning their present science teacher and to read carefully each question and interpret it to the best of their ability without discussion with their classmates or students in other classes.

RESULTS

(1) The presage characteristics, exhibits student empathy (0.4333), friendliness (-0.2423) and consistent and predictable (-0.2308), are reported as perceived characteristics that appear to relate to perceptions of effectiveness. (2) The variables, explains until understanding is achieved (-0.3418), uses student ideas (-0.3175), clarity (-0.2518) and enthusiastic during instruction

(-0.199), are perceived as effective process variables. Even though these numbers have negative characteristics, their deviation from zero indicates significance. (3) Significant differences between ability levels were found at the $p < .05$ level for the characteristic, wide interest patterns and the $p < 0.01$ level for subject area prepared. The other presage characteristics indicated no significance between ability level. (4) Significant differences at the $p < 0.01$ indicated in Table 10 suggest the variables, clarity and enthusiasm, differ between ability levels.

SIGNIFICANCE

Implications from this study indicate that students have the ability to distinguish presage and process characteristics emphasized in effective teaching. Current preparation for science teaching generally includes knowledge of the subject matter, preparation and planning techniques, and methodology. As indicated in this survey, students perceive the interpersonal characteristics such as friendly, empathetic with students, explains until understanding is achieved, consistent and predictable and uses student ideas as personal and process variables even more important than the cognitive level of science teaching. This survey, also, correlates highly student perceptions of effective science teaching to characteristics perceived by teachers and educator (Bybee, 1975). When the results of this survey and other recent surveys are compared with the ranking of similar teacher characteristics in the Research on Science Education Survey (ROSES), there is a discrepancy. Science educators in the ROSES study ranked the essential attributes of science teacher as knowledge of the subject matter, understanding the nature of science, methods and planning.

Perhaps the difference in these rankings relates to the period of time. The ROSES study was completed at a time when the emphasis in science teaching was heavily on the cognitive, between 1965 and 1967.

Past studies have also noted the importance of perceptions of effective teaching from different groups. Elementary students, undergraduates, advantaged, average and disadvantaged students and teacher perceptions in different fields of science and educational backgrounds have resulted in no significant difference between effective science teaching characteristics (Bybee, 1975). The ability groups of this survey did point out significantly characteristics that may be important in the teaching of one ability group over the other. As indicated in the results, high discriminant function coefficients were given for subject area prepared, wide interest patterns, clarity, provides opportunities to learn criterion material during instruction and enthusiasm, which may indicate that students in specific ability levels place different emphasis on those characteristics that contribute to perceive effectiveness. If this may be the case, pupils identified as high ability may place a greater value on the teacher's subject area training than on interpersonal characteristics. Conversely, pupils identified as low ability may place a greater emphasis on student-teacher relationships than on subject matter training.

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